EPA has reviewed the revised pre-public notice draft permit, fact sheet, and IDEM's responses (received on 1/9/13). We have the following comments and questions.

Typographic error:

• Page 32 of the fact sheet, the sample type for phenolics should change to grab instead of 24 Hr. Comp. (IDEM agreed in the responses)

• Page 32 of the fact sheet, the sample type for sulfide should change to 24 Hr. Comp. instead of grab. (IDEM agreed in the responses)

• Page 12 of the fact sheet, the last sentence of the first paragraph of Ineos offsite facility description. The exclusion of CWT should change to 40 CFR 437.1(b)(3) instead of 40 CFR 437.1(3).

• Page 35 of the draft permit, Part I.H, removal the wordings "MAINTENANCE AND" should read as "DIFFUSER MONITORING REQUIREMENTS". There is no diffuser maintenance and operation plan in the draft permit.

• Page 22 of the fact sheet, Part 5.1 Existing Permit Limits for Outfall 005. The mercury's Interim Variance Limits "23.1 ng/L" should be included in the Effluent Limitations Table

• We notice the draft permit doesn't have Part I.A.2, you may want re-numbering the draft permit.

Comments and questions:

• Outfalls 005 and 001 Effluent Limitations Tables, we noticed the existing permit regulates "BOD5", and the draft permit regulates "TBOD5". Please explain the difference between "BOD5" and "TBOD5"?

• Vanadium's reopener clause:

We recommend that monitoring vanadium be required for one year after replacement.

• We recommend IDEM revise the WQBELs loading limits at outfall 005 and 001 based upon the recent flow rate.

• We recommend that the fact sheet should address how the SMV is adequate for the permit renewal. Consideration should be given to mercury treatment technologies available and economically viable such as those demonstrated by the Argonne National Lab and Purdue University studies and pilot scale testing. IDEM's process for re-evaluating the SMV renewal based upon the requirements of IDEM's SMV renewal rule should be clarified (has BP complied with SMV permit modification requirements from 2/12 to present?).

• The footnote [1] of Outfalls 005 and 002 of the draft permit, and Part 5.8 of the fact sheet, Water Treatment Additives. We recommend the draft permit and fact sheet provisions pertaining to this be revised as follows:

"In the event that changes are to be made in the use of water treatment additives including dosage rates for approved additives contributing to Outfall 001 (or Outfall 002) that are greater than the dosage rate identified in the permit application, the permittee shall notify the Indiana Department of Environmental Management as required in Part II.C.1 of this permit. The use of any new or changed water treatment additives or dosage rates shall not cause the discharge from any permitted outfall to exhibit chronic or acute toxicity. Acute and chronic aquatic toxicity information must be provided with any notification regarding any new or changed water treatment additives or dosage rates greater than the dosage rate identified in the permit application.

• Part I.G.1.d, the second paragraph of Testing Frequency and Duration of Whole Effluent Toxicity Tests. We recommend the draft permit provision pertaining to this be revised as follows:

"After three tests have been completed, that indicate no toxicity as defined in paragraph f., the permittee may reduce the number of species tested to only include the most sensitive to the toxicity in the effluent."

• **Bypass of Diffuser:**

We would like to further discuss bypass of diffuser issues. The draft permit and fact sheet discussion of bypass of diffuser, and the Outfall 001's Effluent Limitations Table.

The revised draft permit doesn't adequately address our concerns. IDEM should either prohibit all discharges from outfall 001, and include a discussion in the fact sheet of how IDEM might exercise enforcement discretion (consistent with our prior comments) or authorize discharge but include effluent limitations that are calculated without taking into account dilution provided by the diffuser. If the permit is revised to include such effluent limitations, then the Monitoring Measurement Frequency should change to "When Occur/daily" for all parameters; and add WET test requirements.

• **Stormwater:**

According to the Fact Sheet, the Storm Water Pollution Prevention Plan only describes controls for storm water discharges associated with industrial activity from the J&L and Lake George Area of the facility. We understand that storm water from the process areas of the plant are collected, as necessary, in the new storage tank (TK-5052) prior to discharge from the WWTF. However, we would like to know if there are any controls in place on the remainder of the facility that would lessen the impact untreated storm water discharges if the storage tank was filled to capacity and had to be by-passed.

• **Thermal and CWIS comments**

Permit

1) p.48 This variance renewal shall be valid as long as there is no significant increase in the thermal discharge or heat rejection rate from this facility.

   This is an inappropriate statement as the 316(a) expires with each permit and has to be requested to be renewed. The facts at each reissuance should be reassessed independent of previous granting of the 316(a) limitations…clearly the same decision can be reached, but all new information should be considered. This section should also refer to the maximum and average limits or neither…currently it only refers to the average limit and is misleading as to what limits apply.

2) p.48 It appears that the previous language was not deleted when the current CWIS language was pasted in. This should be removed.

Fact Sheet

1) p. 4 In Item 2, it indicates that BP has not submitted the biological component, this should be updated.

2) p.39 The description here should identify the limits based upon water quality that would have applied if a 316(a) demonstration was not successful (see Hanlon Memo). The standards are discussed, but not what limits would have been included in the permit. This is also required for the PN.

3) p.40 The finding of IDEM should be that the alternate effluent limitations ensure the protection and propagation of the balanced and indigenous population of fish, shellfish and wildlife in and on the waterbody…best to stick to the statute language as possible.

Responses to EPA comments

1) BP responses to 316(a)

   1) The demonstration should include the thermal plume study conducted in 2010 as the hydrology and assumptions in that study are critical to understanding the extent of the plume as modeled and the impact on the RIS. It can be incorporated as an appendix, but the demonstration should utilize more of the information in its findings. Of interest specifically would be the modeled plumes during the entire year rather than just when biological sampling occurred. It is also not clear from the demonstration what parameters were used to define the worst case scenario referenced when describing the impacts to the RIS. It does not appear that this issue was addressed. Additionally, the limited figures that were provided were in black and white and it was difficult to distinguish the isotherms indicated on the map. EPA requests that a copy of the 2010 thermal plume study be provided for review. EPA is reviewing this document.
   Response: As per the instruction of IDEM (see first paragraph of Section 4.0 in the 2010 Thermal Plume Study), the plume was modeled under worst case conditions. AECOM selected conditions when heat dissipation would be low, current conditions would be extreme (see Section 4.1 of the Thermal Plume Study); considered two different seasonal

regimes (spring and summer), and two sets of expected wind and current conditions; and ran the model under maximum plant load. The parameters associated with the modeled worst case conditions are described in Section 4.1 of the Thermal Plume Study. Plumes resulting from these worst case combinations are shown in Figures 1-2 through 1-5 of the 316(a) report. Temperatures will not be limiting during the winter so there is no need to assess worst-case conditions during this season. Lake temperatures in the fall are similar to those in spring so separate analysis of fall worst case conditions is not needed.

EPA still believes that a more comprehensive description of the thermal plume should be incorporated even though biological sampling was only conducted in a limited time frame. Incorporation of the thermal plume study as an appendix would achieve this result with hopefully some dialogue in the text. EPA is recommending these changes to ensure that at permit renewal, the same issues are not raised due to lack of information in the demonstration.

In terms of delta-Ts, the maximum values (18°F) generated by the model are the same regardless of season so long as the key input parameters (i.e., plant load, volume of water pumped, and heat dissipation rate) remain constant. Thus, the RIS assessment of a particular delta T applies regardless of when that delta T value occurs. Of greater interest to the fish is the resultant temperature after the maximum (i.e., 18°F) delta T has been applied, not the season in which the 18°F delta T occurred. Obviously, a delta T of 18°F is potentially more problematic during the summer when the ambient lake temperature could be 70 or even 80°F, than during the spring or fall when the ambient lake temperature might be 50°F. Thus, the RIS assessment effectively addressed the various worst case conditions regardless of when they occurred.

EPA disagrees with this assessment as temperature of the effluent can have different influences on the population dependent upon time of year and life history. The delta T can affect fish in winter by causing attraction and can lead to abnormal metabolic rates that may deplete winter reserves when food sources are minimal and lead to deterioration of the organisms. It could also affect reproduction as is documented in the literature regarding the need for cooling periods to achieve gametogenesis. While EPA would not disagree that the area of impact could be determined to not affect the larger population in this region of Lake Michigan, these are still potential impacts of the thermal discharge and should not be dismissed without consideration

On March 4, 2011 the thermal plume study was submitted to IDEM. This file is too large to email and it is expected IDEM would provide EPA a copy of this document.

2) From the application forms, outfall 005 discharges at temperatures similar to outfall 002 yet it is not clear that the impact of this discharge was assessed in the demonstration. EPA would agree that the dilution factor applied to this outfall would not indicate reasonable potential to exceed standards for this outfall alone, but for the 316(a) demonstration, it must be considered as it contributes a thermal load within the study area that could affect the thermal plume and the model may be inaccurate.
Response: Outfall 005, the wastewater plant discharge, was included as part of the BP thermal model. Therefore, inputs from Outfall 005 were accounted for and the model is accurate. Because the thermal "signal" from Outfall 005 is so weak, the thermal signature from Outfall 005 cannot be detected relative to background conditions. Therefore, the model cell in which Outfall 005 is located was considered to represent

ambient lake conditions. This makes sense because, by design, the amount of dilution achieved at the edge of the approved mixing zone for Outfall 005 is 37 to 1. Because of the amount of dilution, temperatures at the edge of the mixing zone will be indistinguishable from ambient temperatures. It also follows that if adverse impacts are not expected from Outfall 002, where delta T's can reach, if only briefly, 18 F, then no impacts would be expected at the edge of the Outfall 005 mixing zone where temperatures are indistinguishable from ambient.

EPA disagrees with this assessment. If 005 discharged outside the plume of 002, then the argument would have some merit that it can be treated as ambient…however, this is not the case. Since 005 discharges at temperatures similar to 002 directly into the 002 plume at certain conditions, it is unreasonable to say that 005 has no impact due to dilution…it is diluting with the 002 thermal plume water which at times reaches 18F above ambient from the model (Scenario 6 for example). You cannot then assume that dilution to ambient is achieved rapidly before it encounters the plume from 002, if anything, it could increase the area above 18F in the discharge plume.

3) The demonstration provided to EPA did not contain any of the figures 2-x that included the maps showing the areas where biological sampling occurred. EPA requests that these figures be provided for review. From the descriptions of the areas in the demonstration, EPA has concerns that biological sampling was not conducted within the 1000 ft arc that delineates the standard mixing zone under Indiana regulations. Sampling within the mixing zone is important as it ensures that a complete picture of the distribution of species within the study area is obtained. **IDEM already responded. EPA is revieing these figures.**

4) The demonstration indicated that the biological indices excluded non-native species including alewife, salmonids and white perch. For the salmonids and alewife at least, these species represent a critical species of the biological community in Lake Michigan. While they are non-native species, EPA questions whether it was appropriate to exclude them from the indices given their role in the trophic structure.
Response: The biological indices that were used in the 316(a) report were those mandated by IDEM. BP calculated the indices as per the instructions to the author (Simon and Stewart 2006) and used the groupings or categories provided by IDEM to calculate each IBI metric (see Table 3-5). IDEM specifically instructed BP's contractor to exclude exotic and non-native species from all but one of the metrics (see p. 10 and 11 of the 316(a) report). Furthermore, both alewife and Chinook salmon were agreed upon RIS, so even though they were excluded from most metrics, potential impacts to these two exotics were considered. The thermal tolerance of Chinook salmon is comparable to that of other salmonids (EPRI 2011). Thus, potential thermal effects to alewife and salmonids were considered as part of the RIS assessment.

EPA believes that in future updates of the indices that these species should be included.

5) The biological sampling indicated that some species have become more abundant and that a revision to the RIS may be necessary to ensure that the appropriate species are

being assessed. Specifically, sand shiner was 3 times as abundant as the spot tail shiner that is part of the RIS.

Response: First, we are not aware of a situation where a change to an agreed-upon RIS list has been made based on the results of the biological sampling as this defeats the purpose of submitting an RIS list before embarking on the study and having the responsible agency approve it. Second, although sand shiner was more abundant, spottail shiner is more representative of the Lake Michigan minnow community. Third, the thermal tolerances of these two minnows is similar and, if anything, sand shiner is more thermally tolerant than spottail shiner (MBI 2006) so choosing spottail shiner as a RIS is conservative. This assessment of the thermal tolerance of sand shiner is supported by the fact that it was most abundant in the 500m subzone closest to the 1000' arc and its abundance decreased sequentially as sampling moved further away from the 1000' arc. In other words, it was most common where water temperatures were warmest. Clearly, sand shiner abundance is not negatively influenced by the BP thermal plume.

EPA is not suggesting to re-evaluate the RIS for this demonstration, however, as new studies are conducted for future permit renewals, it is always appropriate to consider changes in the population and whether the RIS should be revised. Sometimes there are species introductions or reduction/loss of species that are not due to the impacts of the facility. Additionally, one of the requirements of a 316(a) is to assess whether pollutant tolerant species are displacing less tolerant species in the community due to an increased thermal zone of influence.

6) The permit documents also indicate that biological surveys have been conducted in the area of the diffuser to assess any impacts to the biological community. EPA would recommend that these be discussed in the 316(a) demonstration as they represent an assessment of the biological community within the study area.

Response: The studies in the area of the diffuser referred to in the permit looked at lower trophic levels, not fish. Prior to initiating the 316(a) field studies, IDEM agreed (as noted on page 3 of the 316(a) report) that it was not necessary to look at the lower trophic levels because no significant effects to such organisms have been found at other Lake Michigan thermal discharges. Furthermore, because the studies near the diffuser were not designed to assess thermal impacts, the data collected are not useful for that purpose.

EPA does not disagree that it was most appropriate to consider the fish component of the biological community for this demonstration. However, when information is available that serves to better describe the entire aquatic community, especially at minimal cost, it is appropriate to include that information in the demonstration. EPA recognizes that the studies were not intended to assess thermal impacts, but the data on abundance and diversity of organism could be useful even if only qualitatively.